

OP993, OP999



Features:

- Choice of TO-18 (OP993) or T-1¾ package (OP999)
- Small package style ideal for space-limited applications
- Linear response vs. irradiance
- Fast switching time
- Choice of narrow or wide receiving angle



Description:

Each **OP993** and **OP999** device consists of a PIN silicon photodiode molded in a dark blue injection molded shell package that provides excellent optical and mechanical axis alignment, optical lens surface, control of chip placement and consistency of the outside package dimensions.

OP993 has a TO-18 package style and a *wide* receiving angle that provides excellent on-axis coupling. **OP999** has a T-1¾ package style and a *narrow* receiving angle that provides excellent on-axis coupling.

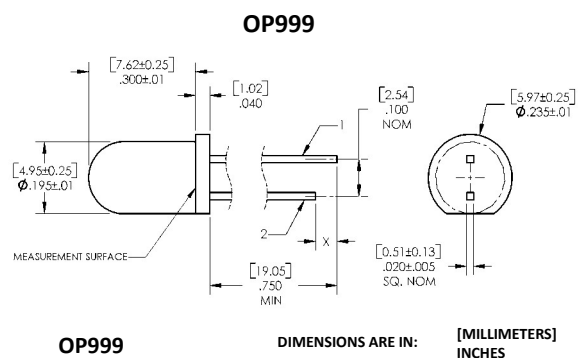
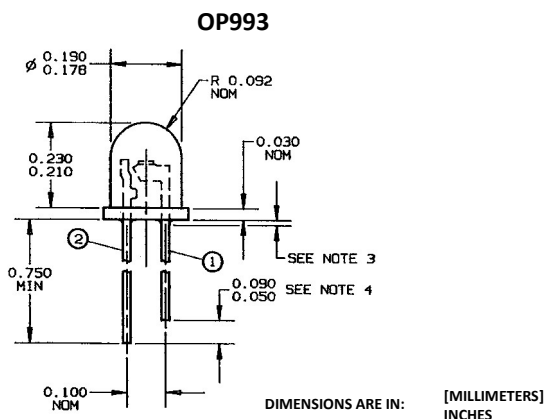
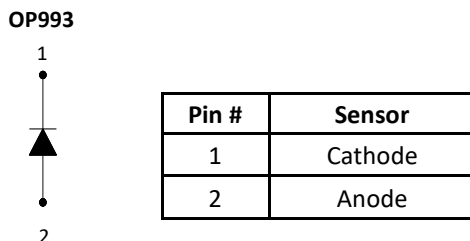
Both devices are 100% production tested for close correlation with OPTEK GaAlAs emitters.

Please refer to Application Bulletins 208 and 210 for additional design information and reliability (degradation) data.

Applications:

- Non-contact reflective object sensor
- Assembly line automation
- Machine automation
- Machine safety
- End of travel sensor
- Door sensor

Ordering Information			
Part Number	Sensor	Viewing Angle	Lead Length
OP993	Photodiode	118°	0.75 min
OP999	Photodiode	18°	



OP999

DIMENSIONS ARE IN:

[MILLIMETERS]
INCHES

Pin #	Sensor
1	Anode
2	Cathode

CONTAINS POLYSULFONE

To avoid stress cracking, we suggest using ND Industries' **Vibra-Tite** for thread-locking. **Vibra-Tite** evaporates fast without causing structural failure in OPTEK'S molded plastics.

General Note

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Electrical Specifications

Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ unless otherwise noted)	
Reverse Breakdown Voltage	60 V
Storage & Operating Temperature Range	-40°C to $+100^\circ\text{C}$
Lead Soldering Temperature [1/16 inch (1.6 mm) from the case for 5 sec. with soldering iron]	$260^\circ\text{C}^{(1)}$
Reverse Breakdown Voltage	60 V
Power Dissipation	$100\text{ mW}^{(2)}$

Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)						
SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
I_L	Reverse Light Current OP993	12.5	-	28.5	μA	$V_R = 5\text{ V}$, $E_E = 1.7\text{ mW/cm}^2^{(3)}$
	OP999	6.5	-	15		$V_R = 5\text{ V}$, $E_E = 0.25\text{ mW/cm}^2^{(3)}$
I_D	Reverse Dark Current		1	60	nA	$V_R = 30\text{ V}$, $E_E = 0^{(4)}$
$V_{(BR)}$	Reverse Breakdown Voltage	60			V	$I_R = 100\text{ }\mu\text{A}$
V_F	Forward Voltage			1.2	V	$I_F = 1\text{ mA}$
C_T	Total Capacitance		4		pF	$V_R = 20\text{ V}$, $E_E = 0$, $f = 1.0\text{ MHz}$
t_r	Rise Time		5		ns	$V_R = 20\text{ V}$, $\lambda = 850\text{ nm}$, $R_L = 50\text{ }\Omega$
t_f	Fall Time		5			

Notes:

- (1) RMA flux is recommended. Duration can be extended to 10 seconds maximum when flow soldering. A maximum of 20 grams force may be applied to leads when soldering.
- (2) Derate linearly $1.67\text{ mW}/^\circ\text{C}$ above 25°C .
- (3) Light source is an unfiltered GaAlAs emitting diode operating at peak emission wavelength of 890 nm and $E_{E(APT)}$ of 1.7 mW/cm^2 for OP993 and 0.25 mW/cm^2 for OP999 average within a 0.25" diameter aperture.
- (4) This dimension is held to within $\pm 0.005''$ on the flange edge and may vary up to $\pm 0.020''$ in the area of the leads.

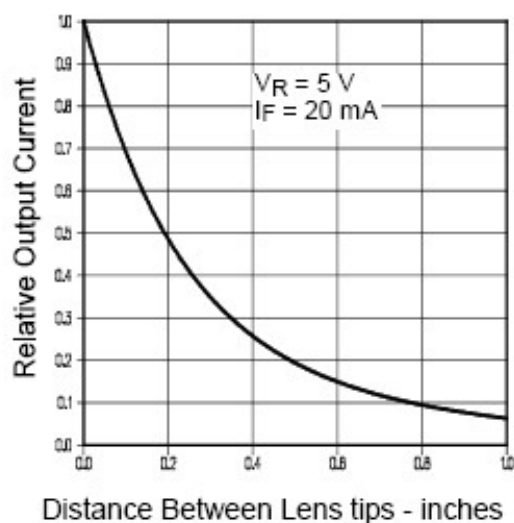
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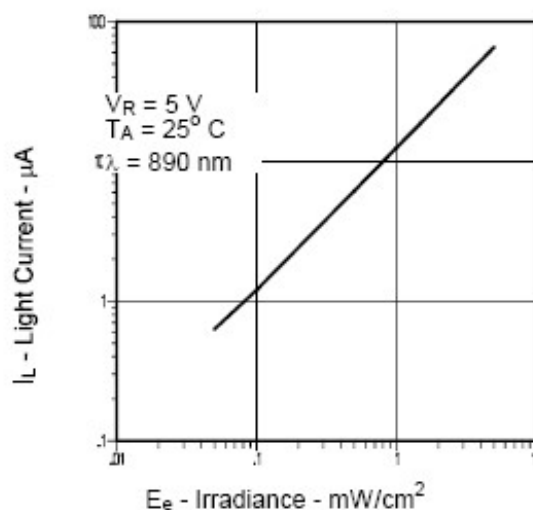
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OP993

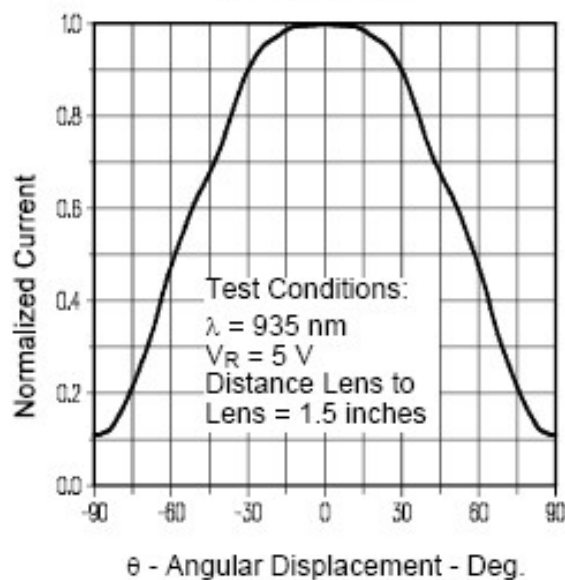
**Coupling Characteristics
OP993 and OP293**



Light Current vs. Irradiance



**Light Current vs. Angular
Displacement**

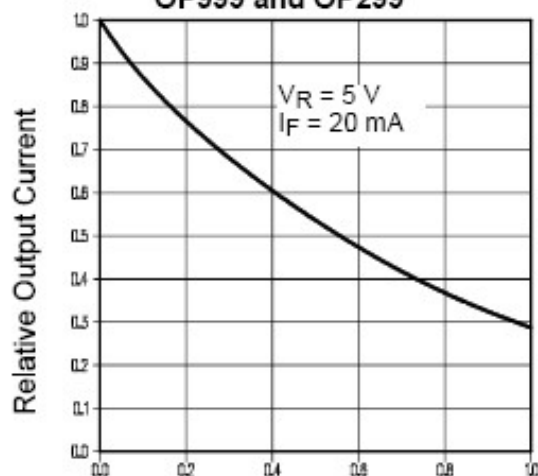


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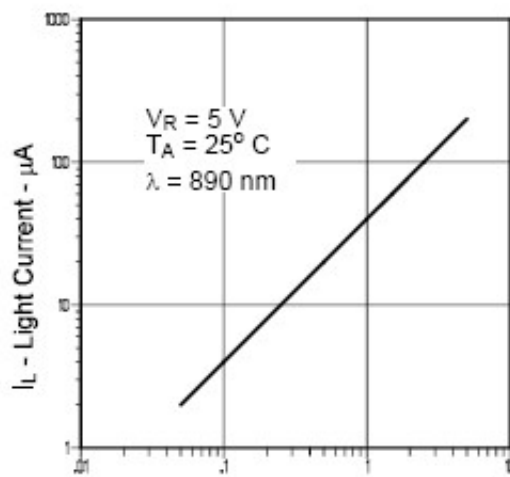
OP999

**Coupling Characteristics
OP999 and OP299**



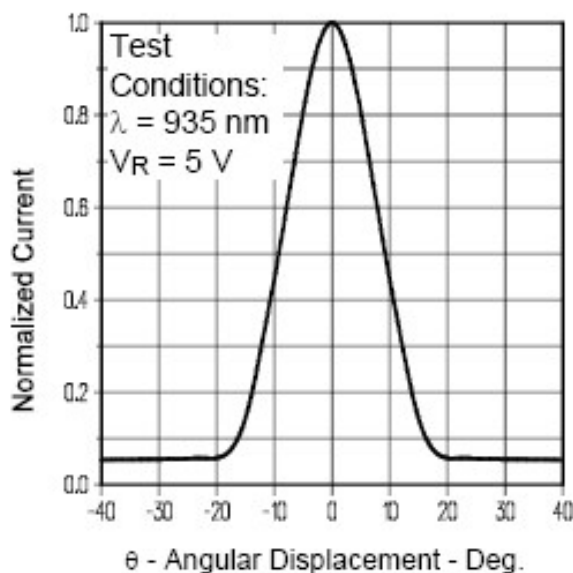
Distance Between Lens Tips - inches

Light Current vs. Irradiance



E_e - Irradiance - mW/cm²

**Light Current vs. Angular
Displacement**



θ - Angular Displacement - Deg.

General Note

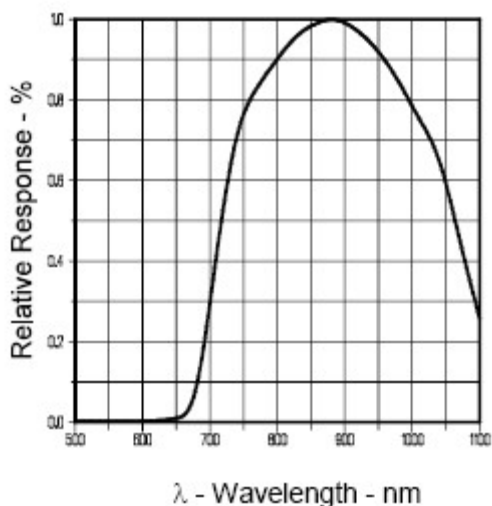
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PIN Silicon Photodiode

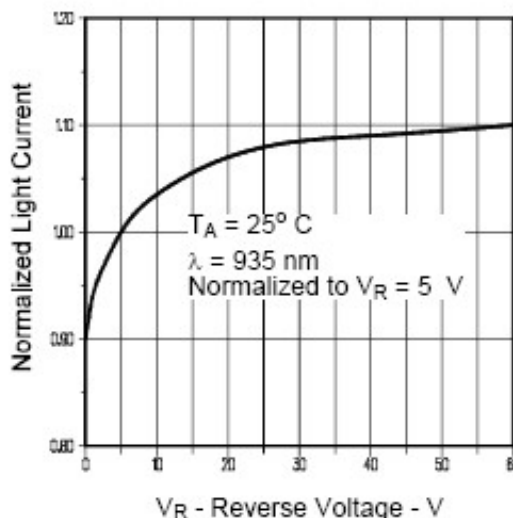
OP993, OP999



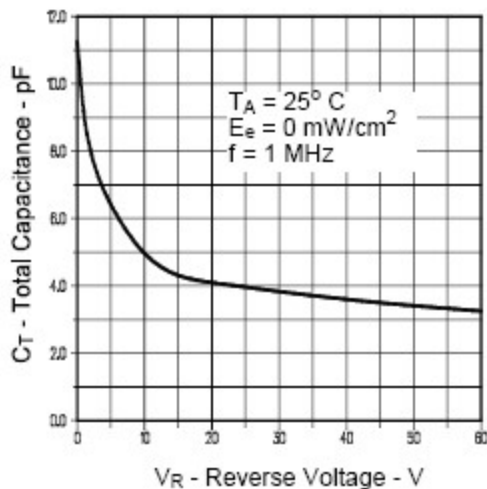
Relative Response vs. Wavelength



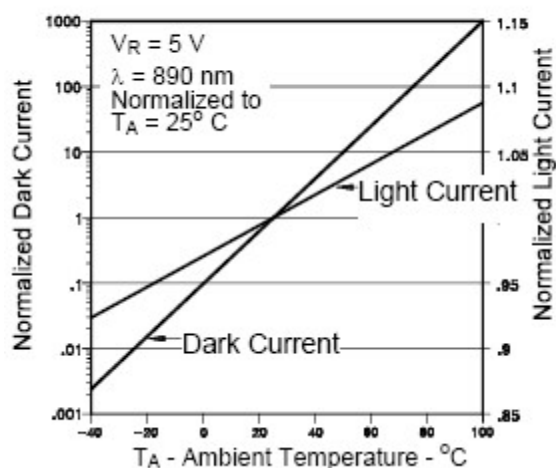
Normalized Light Current vs Reverse Voltage



Total Capacitance vs Reverse Voltage



Normalized Light and Dark Current vs Ambient Temperature



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OP993, OP999

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